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USSR ACQUIRES FREE WORLD EQUIPMENT TO OFFSET OXYGEN STEELMAKING LAG

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USSR ACQUIRES FREE WORLD EQUIPMENT TO OFFSET OXYGEN STEELMAKING LAG

The recent agreement under which the USSR will acquire from Austria an oxygen converter steel plant with a capacity of 2 million metric tons (mt) is the second recent purchase of major equipment for the Soviet steel industry from non-Bloc countries. 1/ In 1961 the USSR bought from an equipment manufacturer in Japan six large oxygen-generating plants that are scheduled for delivery in 1963. 2/ In each case the USSR acquired equipment superior to that now produced in the USSR and capable of providing impetus to the currently lagging program for expanding oxygen steelmaking in the USSR.

1. Cutback in Production of Steel

Negotiations for the oxygen converter steel plant, which had extended over a 2-year period, were concluded at a time when the USSR had cut back the expansion in production of steel to the smallest annual rate since the start of the Seven Year Plan (1959-65). Production of crude steel in 1963 is planned at about 80 million mt, or only 3.7 million mt more than the 76.3 million mt produced in 1962. The increase in 1962 was 5.5 million mt in spite of a shortfall of 600,000 mt, and increases during 1959-62 averaged 5.35 million mt a year.

The significance of the slowdown planned for 1963 as it relates to the probable trend in output of steel in 1964-65 is not clear at present. That Soviet planners may have lowered their estimates of requirements for steel in 1965 is suggested by Khrushchev's comments at last year's Party Congress concerning the fallacy of producing steel merely for the sake of producing it. 3/ If this criticism reflects planning policy, the production goal may have been cut back from the revised target of 95 million mt to a level nearer the original Seven Year Plan goal of 91 million mt.

Khrushchev's statement, however, may have been intended to rationalize the prospect that present difficulties may continue to delay major

programs, one of which is the extensive adoption of oxygen injection practices in steelmaking. Such techniques, particularly when applied in conjunction with other advanced practices, significantly increase the production rates of steelmaking facilities. The rapid growth of oxygen steelmaking, particularly the increase in basic oxygen converter steel, is a major development in steel industries in the West and was planned as such in the USSR. Production of steel in oxygen-fed furnaces was planned to increase from 24 percent of the total in 1958 to 70 percent in 1965, or from 13 million to 64 million mt, based on production of 91 million mt of steel in 1965. 4/ Most of the increase was to reflect the application of oxygen-injection practices to open-hearth furnaces, but a substantial increase was to be obtained by converting several existing Bessemer furnaces to top-blown oxygen units and by installing in nine steel plants new converters incorporating the Soviet version of the Austrian Linz-Donowitz (L-D) design and technology. The nine steel plants are the Krivoy Rog, Il'ich (Zhdanov), Novo-Tagil, Novo-Lipetsk, Azovstal', Chelyabinsk, Karaganda, Kuznets, and West Siberian metallurgical plants.

2. Lag in Oxygen Steelmaking

The Soviet oxygen steelmaking program has lagged consistently, the basic reason being difficulties experienced in designing, producing, and installing both high-capacity oxygen generating plants that are vital to the program and the improved models of the Soviet L-D type of oxygen converter. The latest Soviet-designed large oxygen plant -- the BR-2 unit, which reportedly has an hourly capacity of 11,000 cubic meters (cu m) of oxygen of 99.5 percent purity required in L-D types of converters and 24,000 cu m of oxygen of lower purity usable in open-hearth and blast furnaces -- was to have been operating experimentally at the Azovstal' Metallurgical Plant by the end of 1961 but was not in production by the end of 1962. 5/ As this plant is the prototype BR-2 unit, the delay in installing it has forestalled series production of the unit, in turn threatening the completion of the oxygen converter shop at the nearby Il'ich Plant, which is scheduled to receive two BR-2 units during 1963. Two other oxygen plants, the BR-1K and the BR-12, both of unknown size, are planned to supply new oxygen converter shops in the USSR. Two BR-1K

units, which were to be commissioned in the fourth quarter of 1962 at the Novo-Tagil plant, however, were not completed by the end of the year, and the BR-12 unit is still in the design stage.

There have been similar delays in constructing oxygen converters. No converters have been installed since 1956-57, when the USSR commissioned the only units presently in operation, three 25-mt converters at the Dnepropetrovsk Metallurgical Plant and four 40-mt units at the Krivoy Rog Metallurgical Plant. Delays in obtaining both the planned levels of production and of quality from these facilities were a major reason for the postponement of new converter projects for which plans were outlined, in some cases, as early as 1959. The installation of converters originally was intended to begin in 1961 at the Chelyabinsk and Kuznets metallurgical plants but was deferred until 1964, and open-hearth construction was given priority over converter projects at both the Karaganda and Il'ich metallurgical plants. 6/ Construction of converters currently is behind schedule at both the Il'ich and Novo-Tagil metallurgical plants, where a total of three 100-mt basic oxygen units are to be in operation in 1963.

3. Impact of Imported Equipment

Technological benefits will accrue to the USSR from the acquisition of the Austrian and Japanese equipment, and some increase in production of steel could result during 1963-65, particularly from the availability of considerably increased supplies of oxygen. The three Austrian L-D converters, which apparently are to be installed in the Novo-Lipetsk plant, have a total capacity of 2 million mt of steel annually. In addition to oxygen-generating equipment required to supply these units, which is to be built by the West German firm of Linde, the USSR also will acquire the advanced technology incorporated in the L-D process, widely recognized as among the best in world practice.* The Austrian-built plant is to be the first in the world to use L-D converters in conjunction with continuous steel casting instead of the conventional slabbing mill. The West

* Some measure of the desire on the part of the Soviet authorities to acquire the advanced L-D technology is revealed by their apparent agreement to pay an annual royalty of $1.00 per ton of steel produced. 7/

German firm of Mannesmann apparently will cooperate with the USSR in the design of this continuous casting line. 8/ Operating at rated capacity, the L-D plant could produce about 20 percent of the total converter steel that the USSR planned to produce in 1965. 9/ Delivery and installation of the equipment, however, will require at least 2 years, making it unlikely that production at or near the rated capacity of the converter plant will be achieved before the closing months of 1965.

A more immediate impetus to Soviet production of steel, however, could result from the receipt of the Japanese oxygen-generating plants, which could be in production as early as 1964, barring delays in shipment or construction. In terms of output of oxygen of high purity, each of these installations is larger than the Soviet BR-2 unit, being capable of producing about 16,000 cu m of oxygen of 99.6 percent purity per hour. The aggregate production of these facilities is sufficient to supply fully six top-blown oxygen converter shops of the current Soviet design,* each shop containing three converters of 100 to 130 mt, which together have a rated annual capacity of up to 2.25 million mt. Shops of this size have been planned for the Novo-Tagil, Il'ich, Krivoy Rog, and Karaganda metallurgical plants. Soviet designers have recently completed blueprints for another standard converter shop, containing six converters with an annual capacity of 5.6 million mt, and are presently designing a shop with four 250-mt converters, with a total annual capacity of 6 million mt.** Each of these converter shops could be served by two oxygen plants of the Japanese design if sufficient oxygen storage facilities were provided.

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* Determined on the basis of the relatively high rates of consumption of oxygen (53 to 59 cu m per metric ton of steel produced) characteristic of Soviet practice at the Krivoy Rog and Dnepropetrovsk converter shops. Rates of consumption of oxygen in the US at the Jones and Laughlin converter shop in Cleveland and at the Colorado Fuel and Iron Corporation's plant in Pueblo, Colorado, for which plant statistics are available, have not exceeded 51 cu m per metric ton of steel produced. 10/

** Construction of 250-mt converters is to begin in 1964 at the Azovstal' Metallurgical Plant in the Ukraine. The largest units now in operation in the US have a nominal charge capacity of 272 mt.

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Coord:

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